

#7

1636

RAW SEQUENCE LISTING
 PATENT APPLICATION: US/09/641,892A

DATE: 11/27/2000
 TIME: 15:31:33

ENTERED

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1 <110> APPLICANT: IZUI, HIROSHI
 4 MORIYA, MIKA
 5 HIRANO, SEIKO
 6 HARA, YOSHIHIKO
 7 ITO, HISAO
 8 MATSUI, KAZUHIKO
 10 <120> TITLE OF INVENTION: METHOD FOR PRODUCING L-GLUTAMIC ACID BY FERMENTATION ACCOMPANIED BY
 11 PRECIPITATION
 13 <130> FILE REFERENCE: 195942US0
 15 <140> CURRENT APPLICATION NUMBER: 09/641,892A
 16 <141> CURRENT FILING DATE: 2000-08-18
 18 <150> PRIOR APPLICATION NUMBER: JP2000-78771
 19 <151> PRIOR FILING DATE: 2000-03-21
 21 <150> PRIOR APPLICATION NUMBER: JP11-234806
 22 <151> PRIOR FILING DATE: 1999-08-20
 24 <160> NUMBER OF SEQ. ID NOS: 12
 26 <170> SOFTWARE: PatentIn version 3.0
 28 <210> SEQ ID NO: 1
 29 <211> LENGTH: 4556
 30 <212> TYPE: DNA
 31 <213> ORGANISM: Enterobacter agglomerans
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 34 <221> NAME/KEY: CDS
 35 <222> LOCATION: (2)..(121)
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 38 <221> NAME/KEY: CDS
 39 <222> LOCATION: (322)..(3129)
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 42 <221> NAME/KEY: CDS
 43 <222> LOCATION: (3145)..(4368)
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 47 <222> LOCATION: (4437)..(4556)
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 51 Ala Phe Ser Val Phe Arg Cys His Ser Ile Met Asn Cys Val Ser Val
 52 1 5 10 15
 54 tgt cct aaa ggg cta aac ccg acg cgc gct atc ggc cac att aag tcg 97
 55 Cys Pro Lys Gly Leu Asn Pro Thr Arg Ala Ile Gly His Ile Lys Ser
 56 20 25 30
 58 atg ctg ctg caa cgc agc gcg tag ttataccacc gggaacctca gggtcccggt 151
 59 Met Leu Leu Gln Arg Ser Ala
 60 35
 62 attttacgga agcctctgta aacgcgggtcc caaccacgtt tacaaagggtt cccttacggg 211
 64 ccgggcgcgc gctgcgcaca gtgctcgtat cgctgaactc actacggcaa accgcgaaag 271
 66 cggcaacaaa tgaaacctca aaaaagcata acattgctta agggatcaca atg cag 327
 67 Met Gln

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68                                     40
70 aac agc gcg atg aag ccc tgg ctg gac tcc tcc tgg ctg gcc ggc gcg      375
71 Asn Ser Ala Met Lys Pro Trp Leu Asp Ser Ser Trp Leu Ala Gly Ala
72                                     45          50          55
74 aat cag tct tac ata gag caa ctc tat gag gat ttc ctg acc gat cct      423
75 Asn Gln Ser Tyr Ile Glu Gln Leu Tyr Glu Asp Phe Leu Thr Asp Pro
76                                     60          65          70
78 gac tct gtg gat gca tgg tgg cgc tcg atg ttc caa cag tta cca ggc      471
79 Asp Ser Val Asp Ala Val Trp Arg Ser Met Phe Gln Gln Leu Pro Gly
80                                     75          80          85
82 acg gga gtg aaa cct gag cag ttc cac tcc gca act cgc gaa tat ttc      519
83 Thr Gly Val Lys Pro Glu Gln Phe His Ser Ala Thr Arg Glu Tyr Phe
84 90                                     95          100          105
86 cgt cgc ctg gcg aaa gac gca tct cgt tac acc tcc tca gtt acc gat      567
87 Arg Arg Leu Ala Lys Asp Ala Ser Arg Tyr Thr Ser Ser Val Thr Asp
88                                     110          115          120
90 ccg gca acc aac tcc aaa caa gtg aaa gtg ctg cag ctg att aac gcg      615
91 Pro Ala Thr Asn Ser Lys Gln Val Lys Val Leu Gln Leu Ile Asn Ala
92                                     125          130          135
94 ttt cgt ttc cgc gga cat cag gaa gca aat ctc gat ccg ctt ggc ctg      663
95 Phe Arg Phe Arg Gly His Gln Glu Ala Asn Leu Asp Pro Leu Gly Leu
96                                     140          145          150
98 tgg aaa cag gac cgc gtt gcc gat ctc gat cct gcc ttt cac gat ctg      711
99 Trp Lys Gln Asp Arg Val Ala Asp Leu Asp Pro Ala Phe His Asp Leu
100                                     155          160          165
102 acc gac gcc gat ttt cag gaa agc ttt aac gta ggt tct ttt gcc att      759
103 Thr Asp Ala Asp Phe Gln Glu Ser Phe Asn Val Gly Ser Phe Ala Ile
104 170                                     175          180          185
106 ggc aaa gaa acc atg aag ctg gcc gat ctg ttc gac gcg ctg aag cag      807
107 Gly Lys Glu Thr Met Lys Leu Ala Asp Leu Phe Asp Ala Leu Lys Gln
108                                     190          195          200
110 acc tac tgt ggc tcg att ggt gca gag tat atg cac atc aat aac acc      855
111 Thr Tyr Cys Gly Ser Ile Gly Ala Glu Tyr Met His Ile Asn Asn Thr
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114 gaa gag aaa cgc tgg atc cag cag cgt atc gaa tcc ggt gcg agc cag      903
115 Glu Glu Lys Arg Trp Ile Gln Gln Arg Ile Glu Ser Gly Ala Ser Gln
116                                     220          225          230
118 acg tca ttc agt ggc gaa gag aaa aaa ggt ttc ctg aaa gag ctg acc      951
119 Thr Ser Phe Ser Gly Glu Glu Lys Lys Gly Phe Leu Lys Glu Leu Thr
120                                     235          240          245
122 gcg gca gaa ggg ctg gaa aaa tat ctg ggc gcg aaa ttc ccg ggt gca      999
123 Ala Ala Glu Gly Leu Glu Lys Tyr Leu Gly Ala Lys Phe Pro Gly Ala
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126 aaa cgt ttc tcg ctg gaa ggc ggt gat gcg ctg gtg ccg atg ctg cgc      1047
127 Lys Arg Phe Ser Leu Glu Gly Gly Asp Ala Leu Val Pro Met Leu Arg
128                                     270          275          280
130 gag atg att cgt cat gcg ggc aaa agc ggc aca cgt gaa gtg gta ctg      1095
131 Glu Met Ile Arg His Ala Gly Lys Ser Gly Thr Arg Glu Val Val Leu
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134	ggg atg gcg cac cgt ggc cgt ctt aac gta ctg att aac gta ctg ggt	1143
135	Gly Met Ala His Arg Gly Arg Leu Asn Val Leu Ile Asn Val Leu Gly	
136	300 305 310	
138	aaa aag cca cag gat ctg ttc gac gaa ttc tcc ggt aaa cac aaa gag	1191
139	Lys Lys Pro Gln Asp Leu Phe Asp Glu Phe Ser Gly Lys His Lys Glu	
140	315 320 325	
142	cat ctg ggc acc ggt gat gtg aag tat cac atg ggc ttc tct tcg gat	1239
143	His Leu Gly Thr Gly Asp Val Lys Tyr His Met Gly Phe Ser Ser Asp	
144	330 335 340 345	
146	att gaa acc gaa ggt ggt ctg gtg cat ctg gcg ctg gcg ttt aac ccg	1287
147	Ile Glu Thr Glu Gly Gly Leu Val His Leu Ala Leu Ala Phe Asn Pro	
148	350 355 360	
150	tct cac ctg gaa att gtc agc ccg gtg gtc atg gga tcg gta cgt gca	1335
151	Ser His Leu Glu Ile Val Ser Pro Val Val Met Gly Ser Val Arg Ala	
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154	cgt ctc gat cgt ctg gcc gaa ccg gtc agc aat aaa gtg ttg cct atc	1383
155	Arg Leu Asp Arg Leu Ala Glu Pro Val Ser Asn Lys Val Leu Pro Ile	
156	380 385 390	
158	acc att cac ggt gat gcg gcg gtg att ggt cag ggc gtg gtt cag gaa	1431
159	Thr Ile His Gly Asp Ala Ala Val Ile Gly Gln Gly Val Val Gln Glu	
160	395 400 405	
162	acc ctg aac atg tct cag gcg cgc ggc tac gaa gtg ggc ggc acg gta	1479
163	Thr Leu Asn Met Ser Gln Ala Arg Gly Tyr Glu Val Gly Gly Thr Val	
164	410 415 420 425	
166	cgt atc gtc att aac aac cag gtt ggt ttt acc tcc aac ccg aaa	1527
167	Arg Ile Val Ile Asn Asn Gln Val Gly Phe Thr Thr Ser Asn Pro Lys	
168	430 435 440	
170	gat gcg cgt tca acc ccg tac tgt act gac atc ggc aag atg gtg ctg	1575
171	Asp Ala Arg Ser Thr Pro Tyr Cys Thr Asp Ile Gly Lys Met Val Leu	
172	445 450 455	
174	gca ccg att ttc cac gtc aat gct gac gat ccg gaa gcg gtg gcc ttt	1623
175	Ala Pro Ile Phe His Val Asn Ala Asp Asp Pro Glu Ala Val Ala Phe	
176	460 465 470	
178	gtt acc cgc ctg gcg ctg gac tat cgc aac acc ttc aaa cgc gat gtg	1671
179	Val Thr Arg Leu Ala Leu Asp Tyr Arg Asn Thr Phe Lys Arg Asp Val	
180	475 480 485	
182	ttt atc gat ctg gtg tgc tat cgc cgt cat ggt cac aac gag gcg gat	1719
183	Phe Ile Asp Leu Val Cys Tyr Arg Arg His Gly His Asn Glu Ala Asp	
184	490 495 500 505	
186	gag cca agt gct acc cag ccg ttg atg tac cag aaa atc aaa aag cat	1767
187	Glu Pro Ser Ala Thr Gln Pro Leu Met Tyr Gln Lys Ile Lys Lys His	
188	510 515 520	
190	ccg acg ccg cgt aaa att tac gcc gat cgt ctg gaa ggc gaa ggt gtc	1815
191	Pro Thr Pro Arg Lys Ile Tyr Ala Asp Arg Leu Glu Gly Glu Gly Val	
192	525 530 535	
194	gcg tcg cag gaa gat gcc acc gag atg gtg aac ctg tac cgc gat gcg	1863
195	Ala Ser Gln Glu Asp Ala Thr Glu Met Val Asn Leu Tyr Arg Asp Ala	
196	540 545 550	
198	ctc gat gcg ggc gaa tgc gtg gtg ccg gaa tgy cgt ccg atg agc ctg	1911

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202	cac	tcc	ttc	acg	tgg	tcg	cct	tat	ctg	aac	cac	gaa	tgg	gat	gag	cct	1959
203	His	Ser	Phe	Thr	Trp	Ser	Pro	Tyr	Leu	Asn	His	Glu	Trp	Asp	Glu	Pro	
204	570					575					580					585	
206	tat	ccg	gca	cag	gtt	gac	atg	aaa	cgc	ctg	aag	gaa	ctg	gca	ttg	cgt	2007
207	Tyr	Pro	Ala	Gln	Val	Asp	Met	Lys	Arg	Leu	Lys	Glu	Leu	Ala	Leu	Arg	
208					590					595					600		
210	atc	agc	cag	gtc	cct	gag	cag	att	gaa	gtg	cag	tcg	cgc	gtg	gcc	aag	2055
211	Ile	Ser	Gln	Val	Pro	Glu	Gln	Ile	Glu	Val	Gln	Ser	Arg	Val	Ala	Lys	
212				605					610					615			
214	atc	tat	aac	gat	cgc	aag	ctg	atg	gcc	qaa	ggc	gag	aaa	gcg	ttc	gac	2103
215	Ile	Tyr	Asn	Asp	Arg	Lys	Leu	Met	Ala	Glu	Gly	Glu	Lys	Ala	Phe	Asp	
216			620					625					630				
218	tgg	ggc	ggg	gcc	gag	aat	ctg	gcg	tac	gcc	acg	ctg	gtg	gat	gaa	ggg	2151
219	Trp	Gly	Gly	Ala	Glu	Asn	Leu	Ala	Tyr	Ala	Thr	Leu	Val	Asp	Glu	Gly	
220		635				640						645					
222	att	ccg	gtt	cgc	ctc	tcg	ggg	gaa	gac	tcc	ggg	cgt	gga	acc	ttc	ttc	2199
223	Ile	Pro	Val	Arg	Leu	Ser	Gly	Glu	Asp	Ser	Gly	Arg	Gly	Thr	Phe	Phe	
224	650					655				660					665		
226	cat	cgc	cac	gcg	gtc	gtg	cac	aac	cag	gct	aac	ggg	tca	acc	tat	acg	2247
227	His	Arg	His	Ala	Val	Val	His	Asn	Gln	Ala	Asn	Gly	Ser	Thr	Tyr	Thr	
228				670						675					680		
230	ccg	ctg	cac	cat	att	cat	aac	agc	cag	ggc	gag	ttc	aaa	gtc	tgg	gat	2295
231	Pro	Leu	His	His	Ile	His	Asn	Ser	Gln	Gly	Glu	Phe	Lys	Val	Trp	Asp	
232			685						690					695			
234	tcg	gtg	ctg	tct	gaa	gaa	gcg	gtg	ctg	gcg	ttt	gaa	tac	ggg	tac	gcc	2343
235	Ser	Val	Leu	Ser	Glu	Glu	Ala	Val	Leu	Ala	Phe	Glu	Tyr	Gly	Tyr	Ala	
236		700					705					710					
238	acg	gct	gag	ccg	cgc	gtg	ctg	acc	atc	tgg	gaa	gcg	cag	ttt	ggg	gac	2391
239	Thr	Ala	Glu	Pro	Arg	Val	Leu	Thr	Ile	Trp	Glu	Ala	Gln	Phe	Gly	Asp	
240		715					720					725					
242	ttt	gcc	aac	ggg	gct	cag	gtg	gtg	att	gac	cag	ttc	atc	agc	tct	ggc	2439
243	Phe	Ala	Asn	Gly	Ala	Gln	Val	Val	Ile	Asp	Gln	Phe	Ile	Ser	Ser	Gly	
244	730				735					740					745		
246	gaa	cag	aag	tgg	ggc	cgt	atg	tgt	ggc	ctg	gtg	atg	ttg	ctg	ccg	cat	2487
247	Glu	Gln	Lys	Trp	Gly	Arg	Met	Cys	Gly	Leu	Val	Met	Leu	Leu	Pro	His	
248				750					755						760		
250	ggc	tac	gaa	ggg	cag	gga	ccg	gaa	cac	tcc	tct	gcc	cgt	ctg	gaa	cgc	2535
251	Gly	Tyr	Glu	Gly	Gln	Gly	Pro	Glu	His	Ser	Ser	Ala	Arg	Leu	Glu	Arg	
252			765						770					775			
254	tat	ctg	caa	ctt	tgc	gcc	gag	cag	aac	atg	cag	gtt	tgc	gtc	ccg	tcg	2583
255	Tyr	Leu	Gln	Leu	Cys	Ala	Glu	Gln	Asn	Met	Gln	Val	Cys	Val	Pro	Ser	
256		780						785				790					
258	acg	ccg	gct	cag	gtg	tat	cac	atg	ctg	cgc	cgt	cag	gcg	ctg	cgc	ggg	2631
259	Thr	Pro	Ala	Gln	Val	Tyr	His	Met	Leu	Arg	Arg	Gln	Ala	Leu	Arg	Gly	
260		795				800						805					
262	atg	cgc	cgt	ccg	ctg	gtg	gtg	atg	tcg	ccg	aag	tcg	ctg	tta	cgc	cat	2679
263	Met	Arg	Arg	Pro	Leu	Val	Val	Met	Ser	Pro	Lys	Ser	Leu	Leu	Arg	His	

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268				830			835	
270	ccg	gcc	att	ggt	gag	atc	gac	gat
271	Pro	Ala	Ile	Gly	Glu	Ile	Asp	Asp
272				845			850	
274	gtc	gtg	ctg	tgc	tcc	ggt	aag	ggt
275	Val	Val	Leu	Cys	Ser	Gly	Lys	Val
276				860			865	
278	cgt	aaa	gac	gag	aaa	acc	gat	ggt
279	Arg	Lys	Asp	Glu	Lys	Thr	Asp	Val
280				875			880	
282	tac	ccg	ttc	ccg	cat	cag	gcg	gta
283	Tyr	Pro	Phe	Pro	His	Gln	Ala	Val
284	890						895	
286	cac	gta	cag	gac	ttt	gtc	tgg	tgc
287	His	Val	Gln	Asp	Phe	Val	Trp	Cys
288				910			915	
290	gcc	tgg	tac	tgt	agc	cag	cat	cat
291	Ala	Trp	Tyr	Cys	Ser	Gln	His	His
292				925			930	
294	gcc	acc	ctg	cgt	tat	gca	ggt	cgc
295	Ala	Thr	Leu	Arg	Tyr	Ala	Gly	Arg
296				940			945	
298	ggt	tat	atg	tcc	gta	cac	caa	caa
299	Gly	Tyr	Met	Ser	Val	His	Gln	Gln
300				955			960	
302	gca	ctg	aac	gtc	aat	taa	ttaaaaggaa	agata
303	Ala	Leu	Asn	Val	Asn			Met
304	970							975
306	ctc	gtt	ccc	gac	ctg	cct	gaa	tcg
307	Leu	Val	Pro	Asp	Leu	Pro	Glu	Ser
308				985			990	
310	tgg	cac	aag	aaa	cca	ggc	gat	gca
311	Trp	His	Lys	Lys	Pro	Gly	Asp	Ala
312				1000			1005	
314	gtc	gaa	att	gaa	act	gac	aaa	gtc
315	Val	Glu	Ile	Glu	Thr	Asp	Lys	Val
316				1015			1020	
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319	Ala	Asp	Gly	Val	Leu	Glu	Ala	Val
320				1030			1035	
322	gtt	acg	tcc	cgc	cag	atc	ctg	ggt
323	Val	Thr	Ser	Arg	Gln	Ile	Leu	Gly
324				1045			1050	
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